City of Cookeville Stormwater Detention Design Guidelines

These guidelines will outline the way stormwater detention is to be calculated. Stormwater detention is a necessary part of most stormwater treatment BMP's and is required for most developments.

The Stormwater Ordinance of the City of Cookeville is posted at the City of Cookeville Public Works Department's website and must be read by anyone attempting to perform stormwater calculations with the City of Cookeville. It contains provisions for fees, right-of-entry, definitions, easements and penalties. A major purpose of the Stormwater Ordinance is to improve water quality as well as stormwater quantity (flooding).

Major Points of Stormwater Detention

Stormwater detention is required for any new development or redevelopment containing 10,000 sf or more of impervious area. (Cookeville Municipal Code 14-608, Cookeville Zoning Code, Cookeville Subdivision Regulations)

Stormwater detention is defined as limiting the peak discharge rate for the post developed conditions to be no greater than the peak discharge rate for the predeveloped conditions. This must be accomplished using the 2-year, 5-year, and 10-year storms.

The first flush volume is defined as the first ½-inch of direct runoff from the contributing drainage basin. The first flush volume must be captured and released over a minimum time of 24 hours and maximum time of 72 hours. No first flush runoff off of impervious surfaces shall bypass the treatment facility. Stormwater recharge by infiltrating the first flush volume back into the soil on the site is the preferable method of first flush treatment. Recharge may be accomplished by the use of biodetention basins, rain gardens, bio swales, green parking for overflow lots, or other methods pre approved by the Director of Public Works or his designee. Infiltrating the first flush may not be possible if the site is located on unsuitable soils. In this case, the water quality volume must still be treated though other BMPs designed to remove anticipated pollutants such as oil or grease.

A dry detention basin must have a minimum of 2% slope in the bottom of the basin in order to drain properly. The side slopes should generally be 3:1 (H:V) or flatter, unless transversable access has been designed.

All hydrologic and hydraulic computations for stormwater detention facilities must be prepared and stamped by a registered engineer (licensed in the state of Tennessee) and proficient in this field. Plans must show sufficient information to enable the builder to construct the facility as required.

Underground detention is the use of large underground structures to provide necessary volumes for attenuating stormwater peak flows. All underground detention must be within a structure; gravel or rock beds are not approved for detention. Underground

structures generally provide little or no stormwater quality benefits. The following minimum requirements must be met before an underground storage facility will be considered for approval:

- The underground detention structure must provide adequate access for inspection from the surface. Public safety must be considered.
- The underground detention structure must be constructed of durable materials with a typical 100-year lifetime. Detention storage volume shall not include the porous space within a stone or gravel bed.
- The underground detention structure shall be designed to have positive drainage into the receiving channel or stormwater sewer, assuming there is a 10-year flood in the receiving facility.
- The underground detention structure shall not receive surface runoff directly from parking lots. Surface water shall be directed to a BMP that improves water quality, such as an oil/water separator or grass filter strips.
- Design measures must be taken to trap and store sediments in locations where cleanout and maintenance can be easily performed. This generally requires that some type of water quality inlet or other stormwater treatment BMP must be installed upstream from the underground detention facility.
- Structural measures shall be in place to prevent blockages. Trash racks for periodic removal shall collect floatable waste materials. The underground detention structure shall have a means of being dewatered for inspection and maintenance purposes.
- A detailed maintenance and inspection plan must be submitted and approved (including inspection schedules and guidelines). Evidence of responsibility and financial budgeting must be presented.